Multi-disciplinary Design, Analysis and Optimization (MDAO)

Completed Technology Project (2016 - 2022)

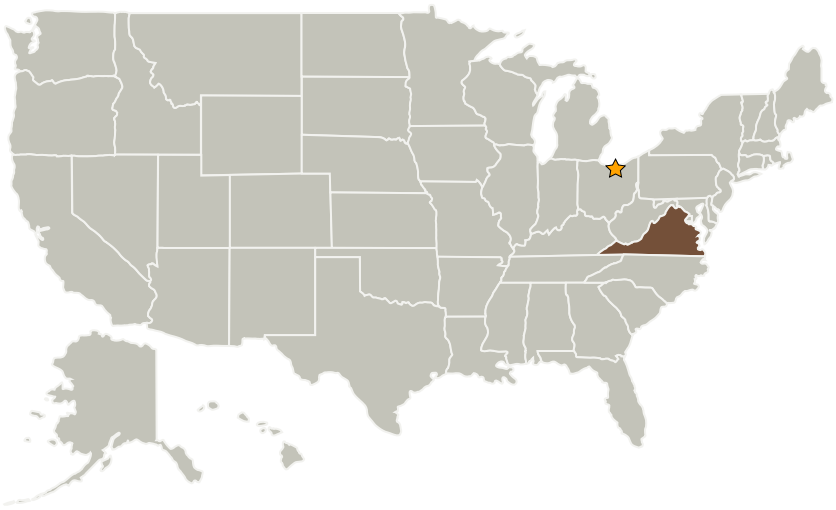
Project Introduction

The Multidisciplinary Design Analysis and Optimization (MDAO) Technical Challenge develops advanced design and optimization tools for coupled multidisciplinary analysis with a range of fidelities to shorten the design cycle of revolutionary new vehicles. It will use X-Plane ground and flight test data to validate the implementation of critical physics required to model new concept aircraft.

Anticipated Benefits

Successful completion of this Technical Challenge advances the state of the art in conceptual aircraft design and analysis tools. These new tools will be used for coupled multidisciplinary analysis of future aircraft concepts, allowing accurate assessment of their anticipated benefits with respect to fuel efficiency, noise, and emissions. They will enable mixed fidelity optimization to solve advanced aircraft MDAO problems efficiently. Reduced order models will be developed to accelerate design solutions. High-fidelity multi-disciplinary optimization with analytic derivatives will be integrated into the aircraft design cycle.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Georgia Institute of Technology-Main Campus(GA Tech)	Supporting Organization	Academia	Atlanta, Georgia
Massachusetts Institute of Technology(MIT)	Supporting Organization	Academia	Cambridge, Massachusetts
Old Dominion University	Supporting Organization	Academia	Norfolk, Virginia
The University of Alabama	Supporting Organization	Academia	Tuscaloosa, Alabama
University of California-Berkeley(Berkeley)	Supporting Organization	Academia	Berkeley, California
University of Maryland-College Park(UMCP)	Supporting Organization	Academia Asian American Native American Pacific Islander (AANAPISI)	College Park, Maryland
University of Michigan-Ann Arbor	Supporting Organization	Academia	Ann Arbor, Michigan

Primary U.S. Work Locations
Virginia

Project Website:

https://www.nasa.gov/aeroresearch/programs/tacp/ttt

Organizational Responsibility

Responsible Mission Directorate:

Aeronautics Research Mission Directorate (ARMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Transformative Aeronautics Concepts Program

Project Management

Program Director:

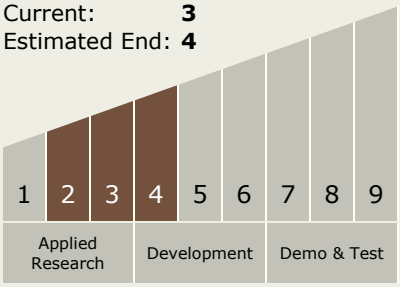
John A Cavolowsky

Project Manager:

Michael M Rogers

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **4**



Technology Areas

Primary:

Continued on following page.

Technology Areas *(cont.)*

- TX15 Flight Vehicle Systems
  - TX15.2 Flight Mechanics
    - TX15.2.4 Modeling and Simulation for Flight

Target Destination

Foundational Knowledge